Research Paper | Education | E-ISSN No : 2454-9916 | Volume : 5 | Issue : 3 | March 2019

TEACHER - CHARACTERISTICS AS DETERMINANTS OF STUDENTS' PERFORMANCE IN BASIC SCIENCE IN SOUTH-WEST, NIGERIA

Funmi Florence Adegbola

Ph. D., Department of Science Education, Faculty of Education, Ekiti State University, Ado Ekiti, Ekiti State, Nigeria.

ABSTRACT

This study investigated teacher- characteristics as determinants of students' performance in Basic Science in South- West Nigeria. The study was a descriptive survey type. Participants were 2089 students and 324 teachers teaching Basic Science in Junior Secondary School which were randomly selected across the four States in South- west Nigeria. Two instruments titled "Basic Science Teachers' Characteristics Questionnaire" (BSTCQ) and "Basic Science' performance Test Questionnaire" (BSPT) were used to collect data for the study. .The reliability of BSTCQ and BSPT were determined through test and retest method and this yielded a correlation coefficient of 0.87 and 0.92, respectively at 0.05 level of significance. Multiple Regression analysis was used to analyze the data. Findings revealed that, teacher - characteristics such as teachers experience, attitude and qualification significantly influence students' performance in learning of Basic Science. It was recommended that adequate measure should be taken by the teachers to ensure that students develop positive attitude towards learning Basic Science by using various teaching styles which could influence students' attitude.

KEY WORDS: Teacher - Characteristics, Students, Attitude, Basic Science, Mathematics.

INTRODUCTION:

Teachers occupy an important position in the teaching and learning of any discipline. Teachers play an important role in educational attainment because they are responsible for translating policy into action and principles during interaction with the students in the classroom. Arafah and Sihes (2015) confirmed that many literature supported that teacher is the main element in formulating and organizing effective teaching. The implication of this is that no other group of people can handle teaching effectively like teachers who have been trained for the job. The performance of students, either positively or negatively depends on devoted teachers.

Obadara (2005) believed that teachers are highly essential for a successful operation of the educational system and they are responsible for crucial educational development of the students. The study of Ayodele (2011) supported that high quality teachers are the best resources and assets of an education system. (Oredein and Oloyede (2007), Obadara (2005), and Adepoju (2002) posited that teachers' characteristics determine students' performance in cognitive, affective and psychomotor domains of learning.

Teachers' characteristics are seen as major issues which can help students to perform very well in their studies. If a teacher lacks the necessary characteristics which could help him to teach effectively, students' performance would be affected in a negative way. Teacher - characteristics as described by Etuk, Afangideh and Uya (2013) are the instructional behaviours exhibited by the teacher towards goal attainment. To them, to realize educational goals and objectives in any educational system, teachers' characteristics must be given priority. Hence, teachers' characteristics that are associated with students' performance in Basic Science are teacher-related characteristics such as teachers' experience, qualification and attitude. As a result of the need to improve students' performance in this subject, emphasis has been laid on teacher characteristics. Oredein and Oloyede (2007) maintained that a well experienced teacher gives assignment and explained it very well to students during class time. They stressed that such assignment can be used as an occasion for feedback to improve students' performance. Trends in teaching are supposed to reflect the professional teaching strategies in Basic Science in the classroom. Teachers' quality in relation to their activities in the classroom helps students to achieve adequate knowledge, if students can develop positive attitude towards learning.

Basic Science is referred to as an intellectual and practical activity which involves the systematic study of structure through observation and experimentation (Millennium Development Goals Project, 2011). It is the subject taught to lay foundation for pure sciences such as Biology, Chemistry and Physics in the senior secondary schools. Basic Science was formally being taught as general science and integrated science in primary and secondary schools in Nigeria.

Researches carried out by Afuwape (2012) and Akani (2016) showed that teaching and learning of science was taught in Nigerian schools as general science in the lower classes one and two of secondary schools up to 1980. Also, Biology, Chemistry and Physics were taught in the upper classes of three, four and five. Later, this general science was replaced with integrated science when the Federal Government restructured the 5-year secondary school system into the 6-3-3-4 system. This system includes six years primary education, three years junior secondary school (JSS) education, three years senior secondary school (SSS) education and four years tertiary education (FRN, 1981).

The teaching and learning of integrated science in Nigerian schools especially at the junior secondary school level continued till 2009 when the Federal Government of Nigeria restructured the 6-year secondary school system into the 9-3-4 system again. Due to massive failure of students in Integrated Science, an attempt was made to search for new and innovative ways of teaching and improving science concepts. Hence, the Science Teachers' Association of Nigeria (STAN) in collaboration with the West African Examination Council (WAEC) led the initiative to help revise and improve the science syllabuses for the West African School Certificate (WASC) and Higher School Certificate (HSC) (Lawal, Orji, Danjuma, Adeyanju and Eyisi 2006).

It appears that numerous studies have revealed the reasons for low performance and consistent failure of students in Basic Science. For instance, Rockoff (2004), Rivkin, Hanushek and Kain (2005) and Aaronson, Barrow and Sander (2007) in their respective studies on the variables affecting students' performance in schools, identified teachers' problem as one of the major problems responsible for failure in Basic Science in schools.

Arguing further, Oke (2003) noted that the low performance of students in pure sciences such as Biology Chemistry, Mathematics and Physics at the senior secondary school rested on the poor foundation laid on Basic Science learned at the elementary and junior secondary school levels. Adesoji and Olatunbosun (2008) specifically remarked that the poor method of instruction, which is one of the teacher - characteristics, has contributed to poor science background. In the same vein, Ogunwuyi (2000) and Yara (2009) added that there exists a strong relationship between teachers' attitude and students' performance in science subjects. However, it is necessary to lay strong emphasis on teachers' characteristics that usually influence students' performance. The study of Adu and Olatundun (2007) contended that teachers' characteristics are strong determinants of students' performance and researchers generally are in agreement that the school variables (which include teachers' characteristics) are critical in the performance of students than other variables (Patrick, 2005).

Etsy (2005) found that teachers' factors that significantly contributed to low academic performance are; lateness to school, absenteeism, and inability to complete the syllabi. Olaleye (2011) submitted that there was a relationship between teachers' characteristics and students' performance. However, the study of Wenglinsky (2001) revealed that teachers' input (such as teachers' experience, qualification, attitude, among others) proved not related to students' performance.

Purpose of the Study:

The purpose of this study was to examine the influence of teachers' characteristics on students' performance in Basic Science in South West Nigeria. The study also examined the relationship among teachers' characteristics and students' performance in Basic Science. It also examined the interaction of each variable on students' performance in Basic Science.

Research Questions:

1. What are teachers' characteristics that can influence students' performance in Basic Science?

2. Will teachers' characteristics determine students' performance in Basic Science?

Research hypothesis:
Based on the purpose of this study, the only null hypothesis generated for the study was that; teachers' characteristics will not significantly influence students' performance in Basic Science.

METHOD:
Research Design: The study adopted descriptive research of the survey type and correlation design to examine the influence of teachers' characteristics on students' performance in Basic Science.

Sample and Sampling Procedure:
The sample for this study was made up of 2,160 junior secondary students and 324 Basic Science teachers that were selected using multistage and purposive sampling procedures. The first stage was the selection of three states (Ekiti, Lagos and Oyo) out of the six states in South West of Nigeria, using simple random sampling technique. The second stage involved the random selection of three Local Government Areas from each of the Senatorial districts of each state selected, making a total of 27 Local Government Areas. The third stage involved the use of simple random sampling technique to select four public secondary schools from each of the selected Local Government Areas making a total of 108 public secondary schools. Stage four involved the selection of 20 students from each of the selected schools (making a total of 2160 students) using simple random sampling technique. The fifth stage involved the selection of three teachers teaching Basic Science in junior secondary school classes from each of the selected schools (making a total of 324 teachers).

Research Instruments:
Basic Science Teacher's Characteristics Questionnaire (BSTCQ) and Basic Science Students' Performance Test (BSPT) were developed to collect information for the study. The Basic Science Teachers' Characteristics contained 25 structured items. Basic Science Teachers' Characteristics Questionnaire (BSTCQ) was used to collect information about teachers' characteristics (personal data). The Basic Science Performance Test (BSPT) has two sections. Section A requested information about the name and sex of the student, and the school location. Section B contained 30-item objective questions which were prepared by the researcher based on the contents of the topics taught by the teachers as at the time of the study. The students were asked to pick the appropriate option on each item. These items were given to six experienced secondary school Basic Science teachers, three science educators and an expert in the area of test, measurement and evaluation from a university for face and content validities respectively. Test-retest was used to determine the reliability of the instruments from which yielded reliability co-efficients of 0.87 and 0.92 for BSTCQ and BSPT respectively

Administration of the Instruments:
The researcher met with the heads of science departments of each school who linked the researcher with the Basic Science teachers and students for the administration of the instruments (BSTCQ) and BSPT). The instruments were jointly administered by the heads of department and the vice principals of the 108 schools selected for the study. The Vice- principals and Heads of Departments, acting as research assistants rated the teachers as they teach their normal lessons by filling the Basic Science Teachers' Characteristics Questionnaire for each teacher rated.

The researcher conducted performance test on students to determine their performance on what they have learned by distributing a 30- item questions from the topics taught (Weather, Measurement, Pure and Impure substances) from the school syllabus. Students' responses to the Basic Science Performance Tests (BSPT) were collected and marked by the researcher while copies of the completed questionnaire were collected by the research assistants.

Data Analysis:
The data collected were analyzed using descriptive of mean, ranking order and inferential statistics of multiple regression analysis.

RESULTS:
Question 1: What are teachers' characteristics that can influence students' attitude in learning of Basic Science and Mathematics?

In order to answer this question, mean and ranking order were used to determine the influence of teachers' characteristics on students' performance towards learning of Basic Science and Mathematics as shown in table 1.

Table 1: Mean and ranking order of teachers' characteristics influencing students' performance in Basic Science

S/N	Teachers' characteristics	N	Mean	SD	%	Rank
1	Teachers' experience	2089	2.00	0.04	17.93	4TH
2	Teachers' qualification	2089	3.59	1.25	32.19	1ST
3	Teachers' attitude	2089	2.42	0.50	21.72	3RD
4	Teachers' gender	2089	3.14	1.03	28.16	2ND
	Total	2089	11.15	2.82	100.00	

Table1 shows the percentage of the teachers' characteristics influencing students' performance in Basic Science. Teachers' qualification which has the highest percentage (32.19%), was ranked first, followed by teachers gender (28.16%), second, teachers' attitude (21.72%), third and teachers' experience (17.93%), fourth. It can be deduced from the table that the highest variable that can influence students' performance in Basic science is teachers' qualification.

HYPOTHESIS:
Teachers' characteristics will not significantly influence students' performance in Basic Science.

Table 2: Multiple regression analysis of teachers' characteristics and students' performance in learning of Basic science

Model	Unstandardized coefficients		Standardized coefficients	T	Sig
	B	Std. error	Beta		
(constant)	72.376	1.939	-.028	37.331	0.000
Teachers' qualification	-.414	.296		-1.398	.162
Teachers' experience	1.917	.726	.053	2.642	.008
Teachers' attitude	1.192	.061	-.392	19.376	.000
Teachers' gender	0.628	0.235	0.059	2.673	0.008

Dependent variable: students' performance in Basic Science.

Multiple R= 0.400 F=97.979
Adjusted R^{2}= 0.158 P= 0.000<0.05

Table 3 revealed that there is positive multiple relationship between the independent variables and students' performance in Basic Science (R=0.400). This implies that all the predictor variables are factors that can influence students' performance in Basic Science. The value of the coefficient of determinant (R2=0.158) indicated that all the independent variables jointly accounted for 15.8% of the total variance in students' performance in Basic Science. Teachers' experience appeared to be the most potent determinant of students' performance in Basic Science followed by teachers' attitude. Teacher's qualification was the least determinant of students' performance in Basic Science while the remaining 84.2% unexplained variation could be due to other variables not examined in this study. This implies that the independent variables will jointly provide a significant explanation for the variation in students' performance in Basic Science. Thus, the hypothesis is rejected, implying that teachers' characteristics will influence students' performance in Basic Science.

DISCUSSION:
The findings revealed positive correlation between teachers' characteristics and students' performance in Basic Science. Teachers' qualification was rated highest among other teachers' characteristics. This is in line with the findings of Adu and Olatundun (2007) and Olaleye (2011) who in different studies found that teacher' characteristics have influence on students' performance. But on the contrast, the findings of Kimmel and O'shea in Ravkin, Hanushek and Kain (2005) revealed that teachers' characteristics (such as teachers' experience) are not significantly related to students' performance. The study showed that teachers' gender was rated second among other teachers' characteristics that can determine students' performance towards Basic Science implying that teachers' gender can also influence students' performance in Basic Science. This is in agreement with the assertion of Al-Jawarneli and Ababneh (2014) and Alglizo, Dodeen and Algaryouti (2003) that gender of the teacher affects performance of the students in learning of Basic Science but the findings of Francis in Al-Dawish, Akbar and Al- Gharabali (2015) revealed that gender does not really lead to effective teaching which could invariably influence students' performance in the classroom. The finding also revealed that teacher's attitude was rated third position which indicated that teacher's attitude can only influence students' performance partially. But the study of Wenglinsky (2001) revealed that teachers' input such as teachers' attitude, experience, and qualification, among others proved unrelated to students' performance. The result also showed that teachers experience was rated as the least teachers' characteristics which could influence students' performance. This is in line with the findings of Kimmel and O'shea in Ravkin, Hanushek and Kain (2005) that teacher- characteristics such as teachers experience cannot significantly relate to students' performance. The findings of Ogunwuyi (2000) and Yara (2009) contradicted that there exists a strong relationship between teachers' attitude and students' performance in science subject.

CONCLUSION:

It is concluded from the findings of this study that teachers' characteristics especially, teachers qualification which was rated highest among other teachers characteristics can significantly determine students' performance in learning Basic Science.

RECOMMENDATIONS:

Based on the findings above, it is recommended that teachers' qualifications should be recognized in allocating subject to them to teach in the classroom. Teachers of Basic Science should be given opportunities to update their knowledge through in-service training. Teachers should be encouraged to register with the Teachers' Registration Council to avoid non-professionalism in the teaching of Basic Science.

REFERENCES:

1. Aaronson, D.; Barrow, L. & Sander, W. (2007).Teachers' and students' achievement in the Chicago public high school. Journal of Labour Economics, 25(1), 95-135
2. Adepoju, O.A. (2002). Evaluation of the school conservation programme of the Nigerian conservation foundations. Unpublished M.Ed. dissertation,University of Ibadan, Ibadan
3. Adesoji, F.A. & Olatunbosun, S.M. (2008).Student, teacher and school environment factors as determinants of achievement in senior secondary school Chemistry in Oyo State, Nigeria. The Journal of International Social Research, 1(2), 13-34
4. Adu, E.O. & Olatundun, S.O. (2007).Teachers' perception of teaching as correlates of students' academic performance in Oyo State, Nigeria. Essays in Education, (20), 57-64
5. Afuwape, M.O.(2012). Integration in Science Teaching- Learning: Problems and prospects. An International Journal of Science and Technology Bahir Dar, Ethiopia. 1 (3), 126-133.
6. Akani, O. (2016). An evaluation of classroom experiences of Basic Science Teachers in Secondary Schools in Ebonyi State of Nigeria. British Journal of Education. 4 (1), 64-76.
7. Arafah, H.& Sihes, A.J.B.(2015). Competencies for the Classroom Instructional Designer. International Journal of Secondary Education.3 (2), 16-20.
8. Ayodele, K.O. (2011). Fostering adolescents' interpersonal behaviour: An empirical assessment of enhanced thinking skills and social skills training.Edo Journal of counseling, 4(1&2), 62-74
9. Etsy, K. (2005). Causes of low academic performance of primary school pupils in Theshamia Sub-metro of Shama Ahanta East Metropolitan Assembly of Ghana.Regional Conference of Education in West Africa, Dakar Senegal, 1st–2ndNovember 2005.
10. Etuk, N.E.; Afangideh, M.E. & Uya, A.O. (2013).Student's perception of teachers' characteristics and their attitude towards Mathematics in Oron Education Zone, Nigeria.International Educational Studies, 6(2), 197-204
11. Kimani, G.N.; Kara, A.M. & Njagi, L.W. (2013).Teachers' factor influencing students' academic achievement in Secondary Schools in Nyandarua Country, Kenya. International Journal of Education and Research. 1(3), 1-14
12. Lawal, T.E., Orji, A.B.C., Danjuma, I.M. et al (2006). History and Philosophy of Integrated Science Education in Nigeria.14/16 National open University of Nigeria. Lagos.
13. Millenium Development Goals(MDGS) Project (2011). Manual for the re-training of Junior Secondary School Teachers. Basic Science and Technology, National Teachers' Institute, Kaduna, Nigeria.
14. Obadara, N.O. (2005). A prospective longitudinal study of psychological predictors of achievement, 34(3), 285-306
15. Ogunwuyi, O. (2000). A casual model of teachers' and students' factors as determinants of achievement in Secondary School Integrated Science. Unpublished Ph.D. thesis, University of Ibadan, Ibadan.
16. Oke, O.A. (2003). Scientific attitude: A challenge for effective Integrated Science education in Nigeria. Journal of Science Educational and Practice, 1(1), 17-22
17. Olaleye, F.O. (2011) Teachers' characteristics as predictor of academic performance of students in secondary schools in Osun state, Nigeria. European Journal of educational studies 3(3), 505-511
18. Oredein, A.O. & Oloyede, D.O. (2007).Supervision and quantity of teaching personnel effects on students' academic performance. Educational Research and Review, 2(3), 32-35
19. Patrick, B. (2005). Why children must not be compared in Education sight for quality Information Magazine. Kenya
20. Ravkin, S.G; Hahusek, E.A. & Kain, J.F. (2005).Teachers, schools, and academic achievement.Econometrica, 73(2), 417-458
21. Rockoff, J.E. (2004). The impact of individual teachers on students' achievement: Evidence from panel data. The American Journal of Economic Review, 94(2), 247-252.
22. Wenglisky, H. (2001). Teachers' classroom practices and students' performance: How schools can make a difference. Research report. Educational Testing Service.
23. Yara, P.O. (2009). Relationship between teachers' attitude and students' academic achievement in Mathematics in some selected senior secondary schools in Southwest, Nigeria. European Journal of Social Sciences, 11(3), 364-369